

56. (Amended) The method of claim 55, wherein oxidizing the [metal] zirconium layer includes oxidizing a [metal] zirconium layer to form an oxide with a conduction band offset in a range of approximately 5.16 eV to 7.8 eV.

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on October 4, 2002, and the references cited therewith.

Claims 1, 9, 14, 22, 30, 51, 55, and 56 are amended, claims 3, 11, 16, 24, 32, and 53 are canceled, and no claims are added; as a result, claims 1-2, 4-10, 12-15, 17-23, 25-31, 33-37, 51-52, and 54-56 are now pending in this application.

§112 Rejection of the Claims

Claims 1-37 and 51-54 were rejected under 35 USC § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The rejection states that, “the insertion of ‘using a substantially thermal process’ into the independent claims 1, 9, 14, 22, 30, and 51 constitutes new matter.” Applicant has removed the language in question without prejudice or disclaimer. Applicant respectfully submits that the 35 USC § 112, first paragraph rejection is therefore moot. Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1-2, 5-10, 13-15, 18-23, 26-31, 34-37, 51-52, and 54 were rejected under 35 USC § 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention.

The rejection states that, “independent claims (1, 9, 14, 22, 30, and 51) do not limit the invention in terms of thermal evaporation deposition method.” In the interest of moving this application forward towards allowance, Applicant has made amendments to claims 1, 9, 14, 22, 30, 51, 55, and 56. Applicant respectfully submits that the claims as amended are in compliance

with 35 USC § 112, second paragraph. Reconsideration and withdrawal of the rejection is respectfully requested.

§102 Rejection of the Claims

Claims 1-2, 14-15, and 51-54 were rejected under 35 USC § 102(e) as being anticipated by Maiti (US 006020024A).

Applicant does not admit that Maiti is indeed prior art and reserves the right to swear behind this reference at a later date. Nevertheless the Applicant believes that the present invention is distinguishable from the reference for the following reasons.

The rejection states that, “It is understood that Maiti teaches vapor deposition of a metal oxide, or sputtering (both substantially thermal processes) and oxidation of a metal layer and that the instant application teaches electron beam evaporation as an improvement to sputtering and oxidizing the metal.” The rejection also states that, “The claims as written are broad so that they encompass all evaporation methods and sputtering is a physical thermal evaporation deposition technique.”

Maiti appears to show a sputtering process followed by an O₂ anneal (col. 3, line 37), however, Maiti does not show, teach or suggest evaporation depositing a metal layer on the body region using electron beam evaporation.

In contrast, Applicant’s independent claims 1, 14, and 51 include evaporation depositing a metal layer on the body region using electron beam evaporation. Although Applicant respectfully submits that techniques other than electron beam evaporation are patentable as described in the present application, in the interest of moving this application forward towards allowance, independent claims as listed above have been amended to include electron beam evaporation.

Because the Maiti reference does not show every element of Applicant’s independent claims, a 35 USC § 102(b) rejection is not supported. Reconsideration and withdrawal of the rejection is respectfully requested with respect to Applicant’s independent claims 1, 14, and 51. Additionally, reconsideration and withdrawal of the rejection is respectfully requested with respect to the remaining claims that depend therefrom as depending on allowable base claims.

§103 Rejection of the Claims

Claims 22-23 and 30-31 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view of admitted prior art. Claims 5-7, 13, 18-20, 26-28, and 34-36 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view of admitted prior art as applied to claims 1, 14, 30, 36, and 51 above, and further in view of Yano (US 005810923A).

Yano appears to show, as previously stated by the Examiner, depositing of zirconium oxide, not zirconium. Applicant respectfully submits that pursuant to the amendments and arguments presented above under 35 USC § 102(e) that Yano does not cure the deficiencies of Maiti. Reconsideration and withdrawal of the 35 USC § 103(a) rejections with respect to claims 5-7, 13, 18-20, 22-23, 26-28, 30-31, and 34-36 is respectfully requested.

Claims 8-10 and 21 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view of Moise (US 006211035B1). Claims 29 and 37 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view of admitted prior art and further in view of Moise (US 006211035B1).

Applicant respectfully submits that the Moise reference also does not show, teach, or suggest evaporation depositing a metal layer on the body region using electron beam evaporation, and oxidizing the metal layer to form a metal oxide layer on the body region. Moise therefore does not cure the deficiencies of Maiti. Reconsideration and withdrawal of the 35 USC § 103(a) rejections with respect to claims 8-10, 21, 29 and 37 is respectfully requested.

Claims 3-4, 11-12, 16-17, and 55-56 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view Park (US Patent No. 5,795,808), or Takeoka (US Patent No. 4,647,947) or Thomas (US Patent No. 4,920,071). Claims 24-25 and 32-33 were rejected under 35 USC § 103(a) as being unpatentable over Maiti (US 006020024A) in view of admitted prior art and in further view of Park (US Patent No. 5,795,808), or Takeoka (US Patent No. 4,647,947) or Thomas (US Patent No. 4,920,071).

The rejection states that,

Park deposits a zirconium film by electron beam deposition (column 4 lines 16- 17) at 99.0 purity or higher (column 4 line 25). Takeoka deposits a zirconium film by electron beam deposition (column 7 lines 65-68). Thomas deposits a zirconium film by electron beam deposition (column 4 lines 55-65). All three of the above references, taken alone or collectively, teach that electron beam deposition is a well-known art recognized equivalent method to sputtering.

Park appears to show a zirconium film 17 deposited over an entire transistor. Either a sputtering or an electron beam deposition process is described. Park does not show formation of a gate oxide.

Takeoka appears to show formation of a metal film 52 for use as a recording media. Electron beam deposition and sputtering are again listed as possible deposition techniques. Takeoka does not show formation of a gate oxide.

Thomas appears to show deposition of zirconium in contact regions. Again, in column 5, lines 1-4, sputtering and electron beam deposition techniques are listed as alternatives. Thomas does not show formation of a gate oxide.

None of the three references listed above teach the formation of a gate oxide layer. The present application discusses several technical challenges that must be overcome in the formation of gate oxide layers, for example, on page 2, lines 3-23, and on page 3, lines 1-8. The present application specifically teaches that sputtering deposition no longer is sufficient to meet increasing performance needs. For example, the present application teaches that sputtering creates large amounts of surface damage.

Applicant respectfully submits that there is no motivation to combine these references to form a gate oxide layer as taught by Applicant's specification, and as claimed in the present application. Applicant submits as an example, none of the references appreciate the differences between sputtering and other deposition methods such as electron beam deposition. None of the above references are attempting to overcome the technical hurdles of forming a gate oxide. The advantages described in the present application will not be realized if, as suggested by the examiner, electron beam deposition is an "equivalent method to sputtering." Without using impermissible hindsight and the teachings of the present application, there is no suggestion of the methods of independent claims 1, 9, 14, 22, 30, 51, and 55.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

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Applicant therefore respectfully submits that claims 1, 9, 14, 22, 30, 51, and 55, as well as claims that depend therefrom, are not obvious under 35 USC § 103(a). Reconsideration and withdrawal of the rejection is respectfully requested.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612-373-6944) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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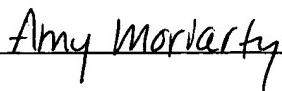
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 31st day of December, 2002.

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